

PROGRAM BASICS AND BACKGROUND

Volunteer monitoring is an integral part of **Clark County's Clean Water Program**. Clark County initiated the Clean Water Program in 2000 to increase protection for our streams, lakes, and groundwater. The program began in response to federal and state mandates for local government agencies to better control and clean stormwater runoff. The Clean Water Fee, which is paid by property owners in unincorporated Clark County, supports the enhanced levels of service required to accomplish these goals (Clean Water Program Annual Report, 2001 summary).

One of the first requirements for protecting or improving water quality is to have a solid foundation of standards, facilities, and programs in place. Since the Clean Water Program began, Clark County has focused on building that foundation by:

- improving stormwater and water quality facilities
- upgrading the standards that protect our water quality
- enhancing inspection, maintenance, monitoring, and education programs
- enhancing enforcement of stormwater regulations

Step by step, the Clean Water Program is building the kind of comprehensive monitoring program that will support efforts to:

- identify water quality problems (and sources of problems)
- document existing health of our lakes and streams and track long term changes
- plan appropriate projects to improve water quality
- demonstrate compliance with the county's National Pollutant Discharge Elimination System (NPDES) permit for the stormwater system

2001 was the first year of the **Long-term Index Site Project**, a countywide effort to gather and analyze data on existing stream conditions, then monitor these streams to track long-term changes in their health. Ten sites are monitored for the following on a regular basis:

- monthly sampling for bacteria, nutrients and minerals; temperature, pH, oxygen, and turbidity (measure of cloudiness of water)
- annual habitat surveys and measurements
- annual sampling of freshwater invertebrates that are indicators of water quality
- continuous monitoring of stream temperature
- continuous measurement of stream flow (beginning 2002)

Volunteer-collected data supports the monitoring objectives of the Long-Term Index Site Project and the Clean Water Program. Several years of sampling and monitoring will be necessary before water quality trends can be detected. At present, the health of each stream varies according to the amount of human disturbance in its watershed. Some are quite pristine, while others are severely degraded.

Volunteers want to be actively involved in caring for their local streams. The primary job of a volunteer monitor is to perform quarterly monitoring at established sites on the stream whose team they have joined. Some volunteers elect to perform clean-ups and small-scale restoration projects on their streams to correct problems identified during monitoring. Some volunteers also elect to do an annual Streamwalk that takes a broader view of their stream.

Data collected during the quarterly monitoring provides baseline information about stream conditions, helps track changes over time, and provides additional information about the character of Clark County streams.

VOLUNTEER PROGRAM GOALS

1. Collect and report useful, credible data for:
 - Describing current stream conditions
 - Identifying trends in watershed conditions
 - Screening for potential problem areas or areas needing further study
 - Helping to prioritize planned efforts at stream restoration
 - Monitoring the effectiveness of stream improvement projects
2. Report information on a regular and timely basis to fellow volunteers, County resource planners, other agencies and organizations, and the general public.
3. Participate in restoration projects on local streams, given need, volunteer interest, staff time, and technical merit.
4. Facilitate public involvement and education in stream monitoring and watershed stewardship.

WHAT KIND OF MONITORING DO WE DO?

The heart of Clark County's volunteer monitoring is our **ambient monitoring** program. Volunteers are organized into small teams, under team leaders, which adopt a stream or other monitoring task. Teams go out quarterly to monitor at several established stream reaches, and over the course of the year they sample the following parameters of stream health:

Biological Parameters:

Benthic-
macroinvertebrates
Fish and wildlife
Noxious weeds
Fecal coliform

Chemical parameters:

Temperature
Dissolved oxygen
Specific conductance
Turbidity
Nutrients
pH

Physical Parameters:

Reach maps
Flow
Gradient
Cross-section
Substrate
Pools
Large woody debris
Canopy closure
Canopy type
Conifer stem count
Erosion
Revetment
Photographs

2002-2003 WORKSCOPE

REGULAR MONITORING ACTIVITIES

Quarterly Monitoring/annual macroinvertebrate and habitat

- Gee Creek: 2 monitoring reaches, one in the upper watershed near Interstate 5 and one in Abrams Park in Ridgefield.
- Jenny Creek: 1 reach located NW of LaCenter near the confluence with the E. Fork Lewis River near the Pacific Highway.
- Upper Fifth Plain Creek: 1 reach located near the confluence with Shanghai Creek at Davis Road.
- Little Washougal River: 1 reach located near the confluence with the mainstem Washougal.

Fecal Coliform Sampling

- Collect samples in the Gibbons Creek and Campen Creek subwatershed as part of the TMDL Implementation monitoring project with Washington Department of Ecology.

DATABASE

- Continue to develop the county's Water Resources database and Web link.

EDUCATION AND OUTREACH

- Perform outreach at public events, schools, and clubs (Watershed Stewards projects).
- Offer educational activities and training/workshops.
- Recruit volunteer monitors.

WHAT HAPPENS TO THE DATA?

Volunteers enter stream data to customized field sheets which are stored at Clark County Public Works Water Resources and can be viewed upon request. The data is then entered into a relational database, along with the data from other Clean Water Program projects, and includes not only monitoring results, but also information about data quality, sampling sites, samplers and their training levels, and links to our geographic information system.

Each of our 25 different measures of stream health, as seen on pages 10-12, provides information of specific interest to a County department and local/state agencies. Since our database is under development and entered data needs to be checked, use of our ambient monitoring data has been limited, thus far, to local biologists and watershed planning groups. Project sponsors use special project data when available.

Clark County Public Works Water Resources is committed to making the stream-data available on its website as part of a grant contract. Water Resources is also working on issuing a "Stream Health Report" to inform citizens about the condition of various county streams. The report will likely include a summary of volunteer collected data and findings.

The main purpose of any volunteer project report is to communicate the data collected in an objective manner to the local citizens, planners, and elected officials charged with making decisions about our local streams and watersheds.

WHO RUNS THE PROGRAM? STRUCTURE AND GOVERNANCE

Clark County volunteer monitoring includes the efforts of citizens, the Clark County Watershed Stewards, and participating civic groups. The county's Water Resources Section manages the program. Ultimate accountability for this program is to the Board of County Commissioners and to the citizens of Clark County.

Water Resources Section staff essentially guide the direction of the program to support ongoing Clean Water Program goals. But the volunteers can influence the location of monitoring locations and project affiliation through particular interests, like salmon habitat restoration, or in geographic areas, like a specific stream or watershed. Water Resources staff works closely with other local and state agency representatives to evaluate existing data and coordinate future monitoring efforts. The volunteer monitoring program is one of the tools used by managers to meet monitoring objectives.



Volunteer Monitor Job Description

SUMMARY: Participate in the volunteer monitoring programs as an active stream investigator and promote community stewardship of the county's natural resources.

RESPONSIBILITIES:

- Perform stream monitoring and other activities when scheduled, following protocols:
 - ⊕ Coordinate with fellow team members to schedule and perform monitoring activities.
 - ⊕ Use field kits and equipment properly while in the field.
 - ⊕ Report low supplies and missing or damaged equipment to county/WSU staff.
 - ⊕ Complete monitoring data sheets and check for accuracy.
 - ⊕ Deliver data sheets to county/WSU staff in a timely fashion.
 - ⊕ Follow inventory procedure for borrowing field kits.
- Attend scheduled volunteer meetings and training sessions.

TRAINING PROVIDED:

- Annual training and refresher in volunteer protocols and procedures, including the use of all monitoring equipment and checkout procedures.
- Clark County Volunteer Orientation.
- Feedback and assistance throughout the year.
- Entry and quality checking of field sheet data.
- Other training and workshops as needed or requested either in-house or by partnering agency.

QUALIFICATIONS:

- Field volunteers must have physical ability to do field work, which may (but won't necessarily) include carrying equipment storage containers, traversing rough ground, and hiking distances of up to a mile to get to a monitoring reach.
- All volunteers will need enthusiasm, flexibility, tolerance, and willingness to learn new things.



Volunteer Team Leader Job Description

SUMMARY: Lead a team of volunteers in monitoring one or more of the streams or projects identified in the current year's volunteer workscope. Participate in the volunteer monitoring program as an active stream investigator and promote community stewardship of the county's natural resources.

RESPONSIBILITIES:

- Same as for volunteer monitors, plus:
 - ⊕ Act as a liaison to the county/WSU office for your stream team.
 - ⊕ Coordinate with fellow members to schedule monitoring activities.
 - ⊕ Ensure that the team members use field kits and equipment properly while in the field.
 - ⊕ Assist in field training volunteers to your stream as needed.
 - ⊕ Ensure that monitoring data sheets are completely filled out and computations are accurate.
 - ⊕ Ensure that field kits and data sheets are returned to the county/WSU office in good time and good condition.
 - ⊕ Attend parts of annual training to recruit new team members; assist with training as needed.

TRAINING PROVIDED:

- Annual training and refresher in volunteer protocols and procedures, including the use of all monitoring equipment and checkout procedures.
- Clark County Volunteer Orientation.
- Feedback and assistance throughout the year.
- Entry and quality checking of field sheet data.
- Other training and workshops as needed or requested either in-house or by partnering agency.

QUALIFICATIONS:

- Same as for volunteer monitors, plus having a willingness and ability to shepherd volunteers through monitoring sessions.

PROJECT STAFF

Clark County volunteer monitoring is managed jointly by the Clark County Department of Public Works, Water Resource Section and the WSU Cooperative Extension. We report to the County's Water Resource Section Manager and the Director of the Public Works Department.

Ron Wierenga began working for the county's Water Resources Section in April 2002. Ron has BS and MS degrees in Environmental Science from Washington State University, Pullman. He has been studying streams, rivers, and lakes for 8 years at the federal and municipal levels, and has been working with volunteer monitors since 1998. Ron is a staff scientist for the county and is active in monitoring, data management and analysis, and is the section's quality assurance officer.

Jeff Schnabel has been working with Clark County since 1997. Jeff has a BS degree in biology from Whitman College and an MS degree in Environmental Science from Washington State University, Pullman. Jeff has been active in the county's Lacamas Lake Restoration Program and is the project manager for the county's Long-term Index Site monitoring and NPDES Illicit Discharge Screening projects.

Gary Bock is the Watershed Stewards Coordinator with the WSU Cooperative Extension in Clark County. Gary received a degree in Environmental Science and Regional Planning from Washington State University, Vancouver in 1996. He worked on the Lacamas Lake Restoration Program, the East Fork Watershed Action Plan grant, and numerous other Clark County projects. Before coming to WSU, Gary spent six years at the Oregon Museum of Science and Industry where he wrote curricula, made public presentations, worked at the coastal camps, and coordinated volunteers.

GENERAL OVERVIEW OF VOLUNTEER ACTIVITIES BY QUARTER

Quarterly Monitoring Sessions											Annual Stream-walk
	Benthic Macroinvert-ebrates	Fish & wildlife sightings	Noxious weeds	Flow	Photo-point photos	Canopy closure (densio-meter reading)	Canopy type/ Conifer stem count	Physical habitat (cross-section, LWD, substrate, pools, erosion/ revetment, gradient)	Water Quality (temperature, dissolved oxygen, conductivity, pH, turbidity)	Grab samples for fecal coliform, E. Coli), and nutrients	Stream-walk, photos & watershed inventory
Winter (Jan)		X	update as needed	X	X	X	Conifer stem count (every 5 years)		X	X	
Spring (Apr)		X	update as needed	X	X				X	X	
Stream-walk (July)		(with Stream-walk)	(with stream-walk)		X						X
Summer (Aug)		X	update as needed	X	X	X	Canopy type %'s	X	X	X	
Fall (Sept 15-Oct15)	X	X	update as needed	X					X	X	

GENERAL OVERVIEW OF VOLUNTEER ACTIVITIES BY PARAMETER

WHAT, WHEN, AND WHY WE MONITOR

During quarterly monitoring sessions, stream teams borrow field kits and receive necessary forms from the county office. Over the course of each year, volunteers monitor the following parameters of stream condition:

Type of Parameter	Indicator	When	Why?	Desired Level or Range
Biological	Benthic macro-invertebrates	Sept 15-Oct 15	Diverse populations of macroinvertebrates signal a healthy stream system capable of supporting fish.	Large diversity of creatures, especially those requiring undisturbed conditions.
	Fish/Wildlife	Quarterly plus Stream-walk (July)	Fish and/or wildlife, or signs of their presence, signal a functioning stream system.	Abundant, diverse populations.
	Noxious weeds	Stream-walk (July); update as needed	Noxious weeds signal an unhealthy stream system and crowds out desired native species.	No noxious weeds.
	Fecal Coliform concentration	Lab samples collected quarterly	Fecal Coliform and/or E. Coli bacteria indicate human and animal waste in runoff water. Fecal matter in streams enriches water with nitrogen, contaminates shellfish, and makes people sick.	100 colonies* per 100 mL.

*surface water quality standards for freshwater class A waters, Chapter 173-201A WAC; most Clark County streams are class A.

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WHAT, WHEN, AND WHY WE MONITOR (CONT.)

Type of Parameter	Indicator	When	Why?	Desired Level or Range
Physical	Broad survey (Streamwalk)	July	Provides an overall picture of stream health.	Naturally-functioning stream system
	Broad survey photographs	July	Document potential problems	-----
	Photo-point photographs	January, August	Track changes in stream over time (qualitative)	-----
	Reach map	At reach establishment, then as needed	Track changes in stream over time (quantitative)	-----
	Flow	Quarterly, plus during extremes if possible	Unusually high, low or changing flows are signs of possible watershed problems	Similar to historical conditions
	Gradient	At reach establishment, then as needed	Characterizes stream geomorphology	Will vary along the length of the stream
	Cross-section	August	Upstream activities can change the channel shape	Relatively stable cross-section
	Erosion and/or revetment	August	Both excessive erosion and artificial bank protection are harmful to fish and a sign of channel instability	Stable banks, little erosion or armoring
	Substrate (Pebble count)	August	Channel bed sediment is critical to the physical and biological functioning of stream channels	Clean rocks of the right size for that stream
	Pools	August	Fish habitat	Abundant, stable pools
	Large woody debris (LWD)	August	Large downed trees help create pools, store sediment, reduce stream energy, and provide cover and nutrients.	Many large downed logs, of conifers if they were historically present
	Canopy closure percentage	January, August	Shade regulates stream temperature and provides cover for fish.	Multi storied canopy, abundant shade year-round
	Canopy type percentages	August	Large conifers are crucial to fish habitat.	Near-historic number of large conifers present in riparian corridor
	Conifer stems	January-every 5 years	Today's small conifers are tomorrow's large conifers	Density close to natural conditions

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WHAT, WHEN AND WHY WE MONITOR (CONT.)

Type of Parameter	Indicator	When	Why?	Desired Level or Range
Chemical	Temperature	Quarterly	Consistently cool streams provide better habitat for salmon. Streams that are unusually warm indicate watershed problems.	18°C maximum *; consistent, cool temperatures
	Dissolved oxygen (DO)	Quarterly	Oxygen in water is vital to growth and development of aquatic life.	Greater than 8.0 mg/L *
	Conductivity	Quarterly	A healthy stream has low conductivity. High electrical conductivity indicates various chemical and biological pollution problems.	No standard established for streams, but unusual readings are cause for concern
	pH	Quarterly	A healthy stream is neither excessively acid nor alkaline; some aquatic life forms can only live within a narrow pH range, others are more tolerant.	pH between 6.5 and 8.5 *
	Turbidity	Quarterly	Turbidity results from suspended solids such as silt. High levels of silt destroy fish habitat.	Clear water, except during high water events
	Nitrate-Nitrogen	Quarterly	Excess nitrogen allows excessive plant growth, leading to eutrophication of water bodies. Sewage and animal waste add nitrogen to streams.	5 mg/L would be cause for concern ("Poor" per Mitchel and Stapp, Field Manual for Water Quality Monitoring, 10 th ed., 1996)
	Total Phosphorus	Quarterly	High levels of phosphorus indicate a watershed problem in most small streams.	50 ug/L for streams feeding lakes; 100 ug/L for streams (EPA aquatic criteria, 1986).

* surface water quality standards for freshwater class A waters, Chapter 173-201A WAC; most Clark County streams are class A.